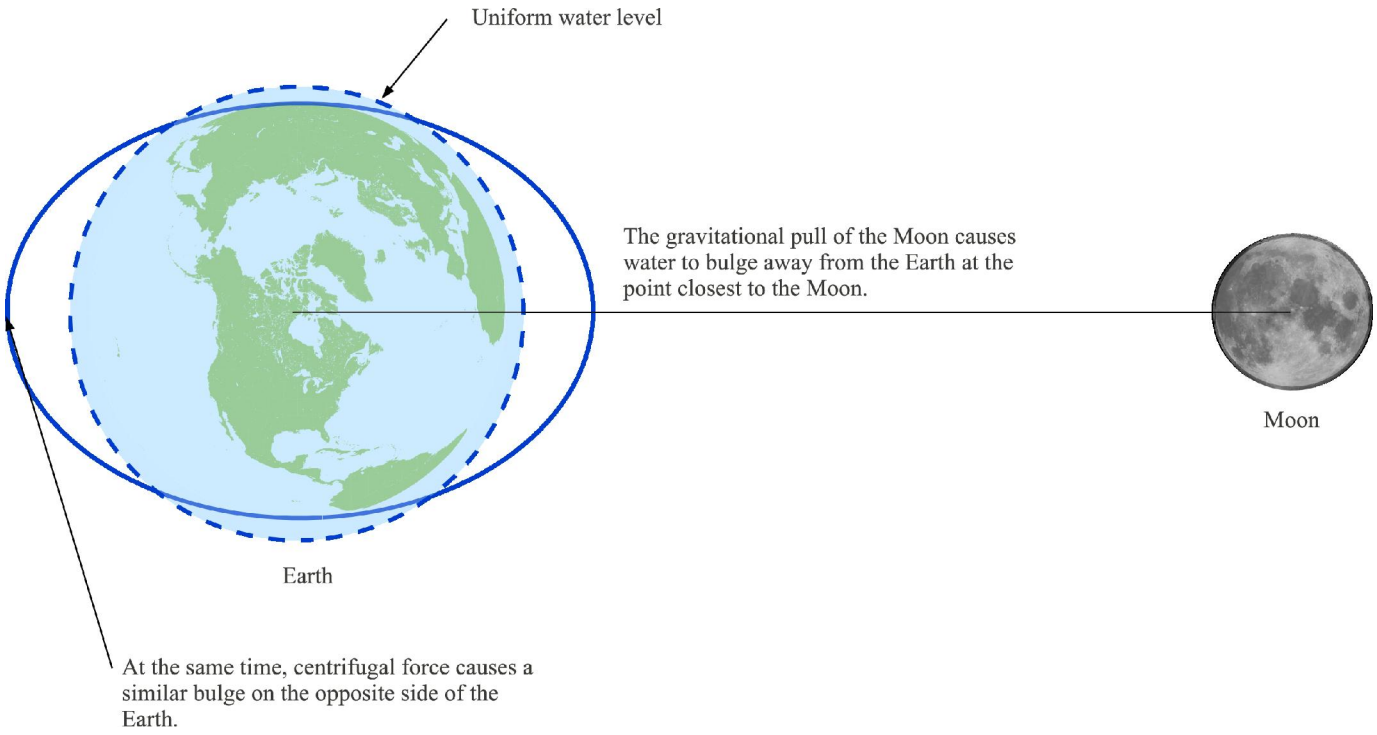
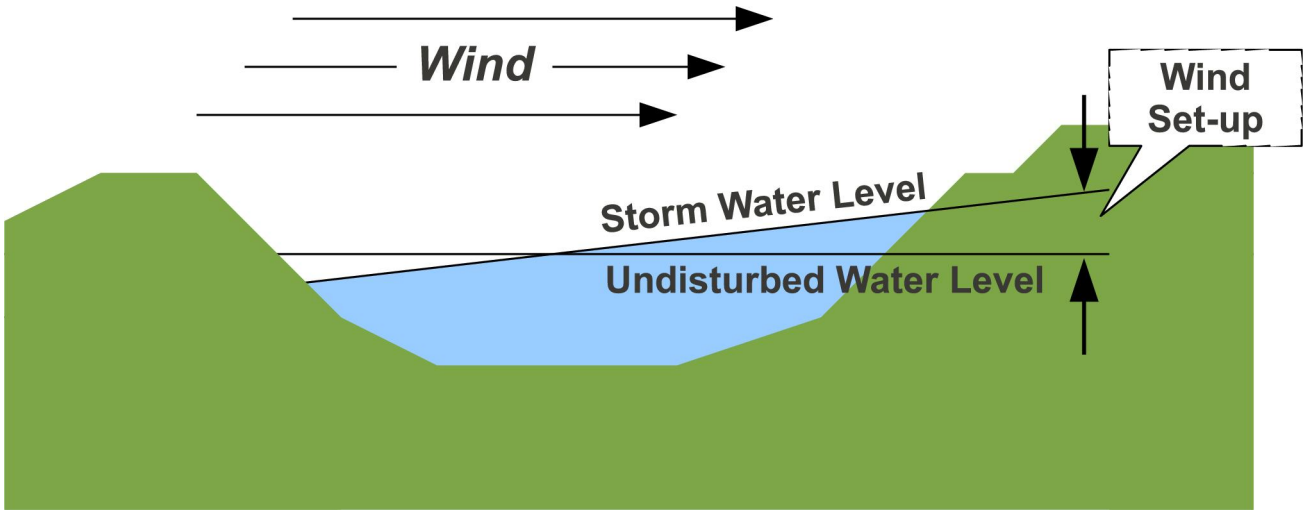
TEACHER MASTER

What Do Tides Have To Do With It?

Water Height Due to Lunar Tides



Water Height Caused by Winds



STUDENT MASTER

What Do Tides Have To Do With It?

For estuaries with mouths opening into the ocean, water level within the estuaries is highly dependent on tides. Fresh water enters the estuary from the upstream watershed. But water also enters and exits the estuary every day because of the tides. The movement of this water in and out of the estuary affects the water in the estuary. It also affects the physical or geographic features of the estuary mouths. High water keeps the mouths open and wide, whereas low water levels may cause the mouths to shut due to sediment and sand movements.

Procedures

1. Use a yard stick to measure your height. Record your height below in feet and inches.

   _____

   Now convert your height in feet and inches to a height in decimal feet. (Hint: Convert the inches to feet by dividing the number of inches by 12.)

   _____

   Write your name and height on a sticky note.

2. What is the name of the Reserve that your teacher has asked you to investigate?

   _____

   You may want to consult the interactive map on the Estuary Education website to find the location of this Reserve.

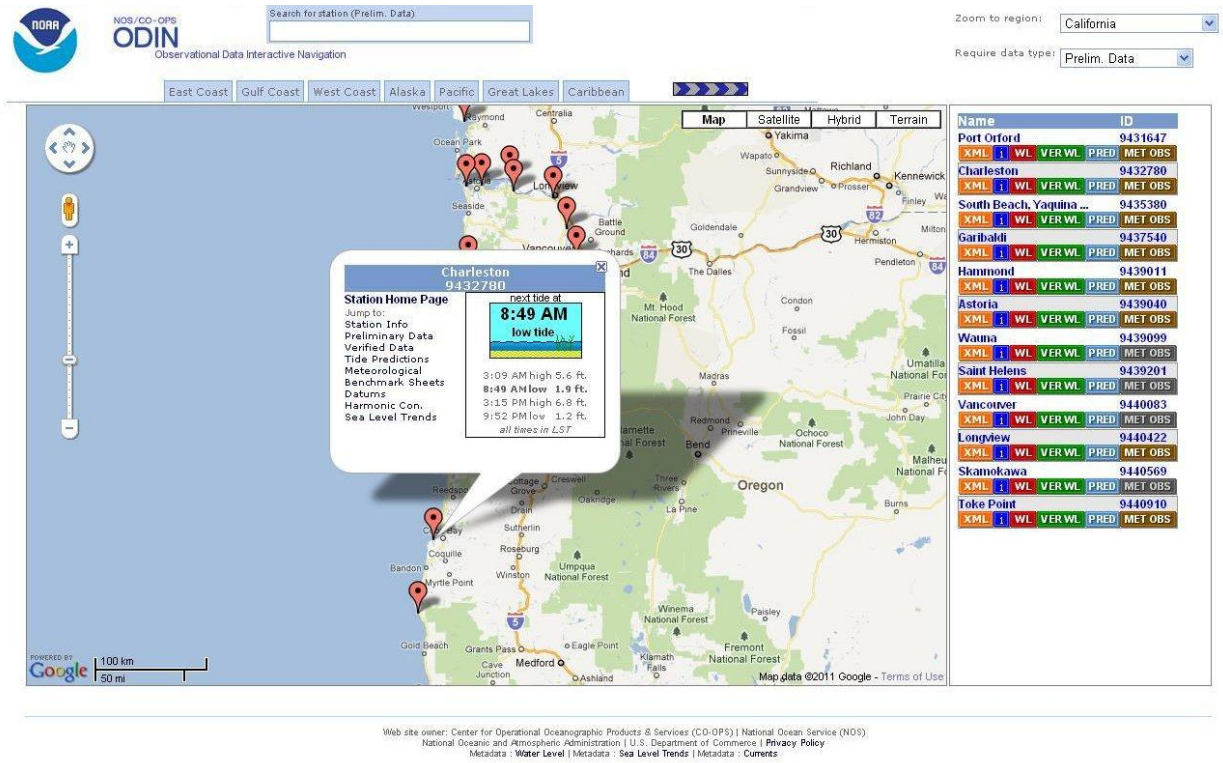
3. Next you will want to get on a computer and find tide information for a location near your assigned Reserve. Go to NOAA's Tides and Currents website:

   http://tidesandcurrents.noaa.gov/

   Click on the map in the middle of the screen. Blue pins on the map on the next page can help you zoom in on specific states or you can use the map's zoom controls. The pink pins on the map represent tide recording sites. Find a pink pin closest to the location of your assigned Reserve.

   What is the name of the NOS tide station nearest your assigned Reserve?

   _____



4. Click on the pink pin to open a popup window with information on today's tides at that location. What you see should look similar to the above screen that shows a data popup for Charleston, Oregon, a tide data site very near Oregon's South Slough Reserve.

   Look in the popup for information on today's tides at that location. Identify the height of the highest tide and the height of the lowest tide for that site. Most sites along the Pacific and Atlantic coasts have semi-diurnal tides. They have two high tides and two low tides each day. Be sure to record both.

   Height of highest high tide _____

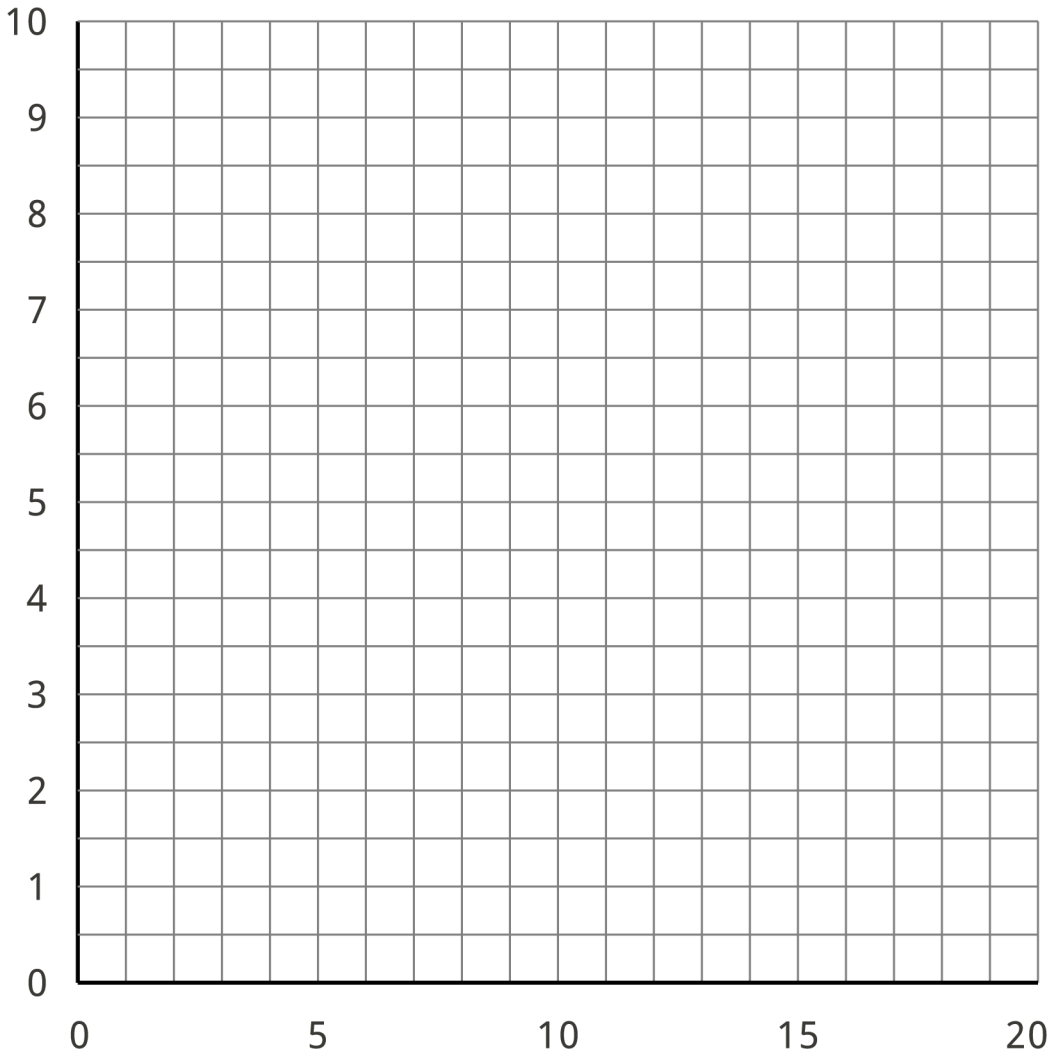
   Height of second high tide (if any) _____

   Height of lowest low tide _____

   Height of second low tide (if any) _____

5. Write the name of your Reserve and the height of each tide on separate sticky notes. Label the high tide notes "High tide" and the low tide notes "Low tide." You should have a separate sticky note for each high tide and each low tide. Your teacher will tell you what to do with the sticky notes.

6. Make a bar chart from the sticky notes on your classroom wall. The vertical axis is height in feet. This is the height of students in your class and the height of the tides at all of the Reserves your class examined. The horizontal axis is a count of the number of tides at a particular height or number of students with a particular height. Group sticky notes into half feet. Your bars will run horizontally. Each half foot should have a bar for tides and another bar for students. Use color pencils to color in the bars and use the key at the top of the chart to indicate which color indicates tides and which color indicates students.



Questions

1. Compare your height to the height of the tide at your assigned Reserve during the day. Is there ever a time when the water would be over your head?

2. Look at your bar chart. Are the heights of most of the high tides greater than the heights of most of your classmates?

3. What is a tide?

4. What causes tides?

5. Reserve scientists monitor water levels daily at most sites. Why is this important?

CLIMATE EXTENSION

Sea Level Trends

Procedures

To complete the questions below visit the Sea Level Trends pages on NOAA's Tides and Currents website:

http://tidesandcurrents.noaa.gov/sltrends/sltrends.shtml

On the Sea Level Online page use the map's zoom controls to find the sea level station nearest your assigned Reserve. Note that not every tide station has sea level trend data so you may have to use the next nearest tide station to your assigned Reserve.

What is the name of the NOS tide station nearest your assigned Reserve? _____

1. Click on the tide station to read the popup for information on sea level trends at that location and record the following information:

   Is the sea level rising or falling? _____ What is the mean sea level trend in mm/yr? _____

   At this rate, how many cm of change would this calculate for the next 100 years? _____

   How many feet of change would this calculate for the next 100 years? _____

2. Repeat these steps at a NOS tide station on a different US coast from your assigned reserve. Read the popup for information on sea level trends at that location and record the following information:

   What is the name of the NOS tide station? _____

   Is the sea level rising or falling? _____ What is the mean sea level trend in mm/year? _____

   At this rate, how many cm of change would this calculate for the next 100 years? _____

   How many feet of change would this calculate for the next 100 years? _____

3. New methods of measuring elevation by satellite indicate a global sea level rise rate of 3 mm/year. How does this global sea level rise trend compare to the trends from the NOS tide station recorded above?

4. Why do you think there are differences in the regional sea level rates and global sea level rates?